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Demographic study of Canine Renal Failure in a Tertiary Veterinary Hospital of Bihar, India

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Abstract

The present study evaluated the incidence and demographic distribution of canine renal failure cases presented at the Veterinary Clinical Complex (VCC), Bihar Veterinary College (BVC), Patna, over a six-month period (July–December 2024). Out of 2,975 dogs examined, 700 showed clinical signs suggestive of renal dysfunction, of which 149 cases were confirmed as renal failure through haematological and biochemical investigations, yielding an overall incidence of 5%. The highest prevalence was observed in dogs older than 8 years (36.2%), followed by those aged 5–8 years (30.2%). Breed-wise, Pomeranians (33.5%) were most commonly affected, followed by Labrador Retrievers (28.1%) and German Shepherds (22.1%). Male dogs (52.4%) were slightly more affected than females (47.6%). A clear seasonal trend was noted, with the highest number of cases recorded in September (23.4%).

Keywords: Canine renal failure, breed, clinical signs, incidence, seasonal variation,

Introduction

Renal failure is a life-threatening condition that severely compromises the kidney's essential roles in electrolyte balance, excretion of nitrogenous wastes, and endocrine regulation, ultimately resulting in uremia and systemic complications (Ogobuiro and Tuma, 2023). In dogs, renal failure is among the leading causes of mortality, contributing to approximately 2–5% of clinical presentations worldwide (Lund *et al.,* 1999). In India, the reported incidence of canine renal failure varies from 0.93% (Thade *et al.,* 2019) to 4.84% (Chawla *et al.,* 2020), with regional differences attributed to environmental influences such as endemic leptospirosis, variations in diagnostic facilities, and differing husbandry practices. The present study was undertaken to evaluate the incidence and demographic patterns, age, sex, breed, and seasonal variation of canine renal failure in Patna, with the objective of facilitating early diagnosis and improving clinical management.

Materials and Methods

Dogs diagnosed with renal failure having varying ages, sex, and breed were selected for the study. dogs showing the clinical signs viz. vomiting, anorexia, depression, fatigue, weight loss, weakness, dehydration, melena, halitosis, diarrhea, oral ulcers, polyuria, polydipsia, lethargy and anemia were initially screened for the diagnosis of renal failure. These were subjected to detailed clinical and laboratory investigations for confirmatory diagnosis. The incidence of renal failure in age group, sex, breed and season was recorded for each dog.

Results

The overall incidence of renal failure among all canine cases presented was 5% (149 out of 2,975 dogs), indicating that renal failure represents a relatively common clinical condition in the canine population.

Sex-based incidence analysis revealed a slight predominance of renal failure in male dogs, with 78 cases (52.4%), compared to 71 cases (47.6%) in females. **Age-wise distribution** showed that dogs older than 8 years exhibited the highest incidence of renal failure, accounting for 54 cases (36.2%), followed by those aged 5–8 years with 45 cases (30.2%). Dogs aged 2–5 years contributed 30 cases (20.1%), while lower incidences were observed in the 1–2-year age group with 15 cases (10.0%), and in dogs younger than one year with only 5 cases (3.3%). Pomeranians was the most affected breed (50 cases; 33.5%), followed by Labrador Retrievers (42 cases; 28.1%) and German Shepherds (33 cases;

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22.1%). **Seasonal distribution** of renal failure cases (n = 149) revealed marked monthly variation, with the highest incidence recorded in September, accounting for 23.4% (35/149) of cases. October followed with 18.1% (27/149) of cases, indicating a sustained high risk during the early post-monsoon period.

Table 1: Sex, Age, Breed wise incidence of renal failure.

Parameter		Number of positive cases (n=149)	Incidence (%)
Sex	**Male**	78	52.4
	Female	71	47.6
Age	**≥1 year**	5	3.3
	1-2 year	15	10.0
	2-5 year	30	20.1
	5-8 year	45	30.2
	> 8 years	54	36.2
Breed	**Pomeranian**	50	33.5
	Labrador retriever	42	28.1
	German Shephard	33	22.1
	Non-descript	7	4.6
	Golden retriever	6	4.0
	St. Bernard	3	2.0
	Beagle	2	1.3
	Bull mastiff	2	1.3
	Pug	2	1.3
	Shih-Tzu	2	1.3

Table 2: Month wise incidence of renal failure

Season	Number of positive cases (n=149)	Incidence (%)
July	23	15.4
August	26	17.4
September	35	23.4
October	27	18.1
November	19	12.7
December	19	12.7

Anorexia and vomiting were the most frequently observed clinical signs; each recorded in 16 out of 18 dogs (88.88%). Diarrhea was noted in 13 dogs (72.22%), whereas halitosis (bad breath) was the least common clinical sign, occurring in 5 out of 18 dogs (27.77%).

Discussion

The present study documented an overall incidence of canine renal failure of 5%, which is comparable with several reports from different regions of India. Chawla *et al*. (2020) reported an incidence of 4.84% in northern India, while Tufani *et al.* (2015) observed a prevalence ranging from 4–6%,

closely aligning with the current findings. Similarly, Karunanithy *et al.* (2019) recorded an incidence of 5.8% in dogs from Bareilly, indicating comparable disease occurrence across geographically distinct regions, including Patna. Age-wise analysis revealed a markedly higher prevalence of renal failure in dogs older than 8 years (36.2%), supporting the established association between advancing age and increased risk of chronic kidney disease (Polzin, 2011). Comparable age-related trends have been reported by Thade *et al.* (2019), and Chawla *et al.* (2020). The progressive and irreversible nature of chronic kidney disease, along with age-associated physiological changes such as declining glomerular filtration rate and tubular function, likely contributes to the higher disease burden in geriatric dogs (Lees *et al.,* 2005). Breed-wise evaluation showed that Pomeranians were the most affected breed, accounting for 33.5% of cases. This finding corroborates earlier reports by Chaitanya *et al.* (2020), and Pathak *et al.* (2023), all of whom reported a higher incidence of renal disorders in this breed. Sex-wise analysis indicated a slight male predominance (52.4%) among dogs affected with renal failure. While Tufani *et al.* (2015) reported a higher prevalence in females, the present findings are consistent with reports by Thade *et al.* (2019), and Chawla *et al.* (2020), who also observed higher incidence in male dogs.

Seasonal analysis revealed a peak incidence during September (23.4%), followed by October (18.1%) and August (17.4%), a similar pattern to that reported by Karunanithy *et al.* (2019). Anorexia and vomiting were the most frequently observed clinical signs, each recorded in 88.8% of affected dogs. These findings reflect the systemic impact of uremic toxicity, wherein accumulation of nitrogenous waste products leads to gastrointestinal irritation and central nervous system involvement (Polzin, 2011). Polyuria and polydipsia, observed in 44.4% of cases, indicated impaired renal concentrating ability, consistent with tubular dysfunction commonly associated with chronic kidney disease.

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